IN THE CLAIMS

This listing of claims replaces all prior versions, and listings, in this application.

Claims 1-25 (canceled)

26. (currently amended) A sol-gel process for the production of nanohybrid sol-gel materials for heterogeneous aerobic catalysis containing tetra-*n*-propylammonium perruthenate (TPAP) entrapped in a sol-gel matrix, comprising hydrolyzing and co-polymerizing organosilanes and silanes in the presence of said TPAP, water, and an organic cosolvent; wherein said co-polymerization is carried out with a precursor fluorinated organosilane amount of up to 25 mol% of the co-polymerization mixture and a non-fluorinated silane monomer; and wherein the molar ratio among the total silica (Si), as fluorinated organosilane + silane, the amount of cosolvent, and the amount of water is in the range from 1:4:4 to 1:8:8.

27. (previously presented) The process according to claim 26, wherein said fluorinated organosilane and said silane are in the form of metal alkoxides.

28. (currently amended) The process according to claim 27, wherein said precursor fluorinated organosilane is a fluorinated ~~silica~~ silicon alkoxide.

29. (currently amended) The process according to claim 28, wherein said fluorinated ~~silica~~ silicon alkoxide is a compound of the formula

$$nR\text{-}Si(OCH_3)_3$$

wherein n is 1, and R represents F or a fluorinated alkyl chain selected from the group consisting of $CF_3(CH_2)_2$, $CF_3(CF_2)_7CH_2CH_2$, and $CF_3(CF_2)_5CH_2CH_2$.

30. (previously presented) The process according to claim 28, wherein said fluorinated organosilanes have the formula $RR'Si(OCH_3)_2$; R represents F- or a fluorinated alkyl chain selected from the group consisting of $CF_3(CH_2)_2$-, $CF_3(CF_2)_7CH_2CH_2$-, and

$CF_3(CF_2)_5CH_2CH_2$-; and R' is a non-hydrolyzable substituent organic group.

31. (previously presented) The process according to claim 30, wherein said non-hydrolyzable substituent organic group is CH_3-, CH_3CH_2-, or $CH_3CH_2CH_2$-.

32. (previously presented) The process according to claim 26, wherein said non-fluorinated silane monomer is $Si(OCH_3)_4$ (TMOS), $Si(OCH_2CH_3)_4$ (TEOS), or a mixture thereof.

33. (previously presented) The process according to claim 26, wherein said cosolvent is methanol, ethanol, propanol, or a combination thereof.

34. (previously presented) The process according to claim 26, wherein the cosolvent is (MeOH), and the molar ratio Si:MeOH:H_2O is 1:8:4.

Claims 35-39 (canceled)

40. (previously presented) A process for the selective heterogeneous aerobic catalytic oxidation of alcohols to carbonyls in a solvent, comprising employing as catalyst a nanohybrid sol-gel material based on silica organically modified and doped with the ruthenium species tetra-*n*-propylammonium perruthenate (TPAP), produced via a process according to claim 26, and employing a solvent selected from the group consisting of toluene, dichloromethane, and supercritical carbon dioxide.

41. (previously presented) The process according to claim 40, wherein oxygen at atmospheric pressure is employed as primary oxidant.

42. (previously presented) The process according to claim 40, wherein during the catalytic oxidation the temperature of the supercritical carbon dioxide is kept within a range of from 50°C to 120°C at a pressure of from 70 bar to 240 bar, and the partial

pressure of the oxygen is kept at about 1 bar.

43. (previously presented) The process according to claim 40, wherein benzyl alcohol, 1-phenylethanol, cyclohexanol, 1-octanol, or trans-cinnamyl alcohol is oxidized.

44. (previously presented) Nanohybrid sol-gel catalyst for the heterogeneous aerobic catalysis containing tetra-*n*-propylammonium perruthenate (TPAP) entrapped in the sol-gel matrix obtained by a process as claimed in claim 26.

45. (previously presented) Nanohybrid sol-gel catalyst for the heterogeneous aerobic catalysis containing tetra-*n*-propylammonium perruthenate (TPAP) entrapped in the sol-gel matrix obtained by a process as claimed in claim 29.

46. (previously presented) Nanohybrid sol-gel catalyst for the heterogeneous aerobic catalysis containing tetra-*n*-propylammonium perruthenate (TPAP) entrapped in the sol-gel matrix obtained by a process as claimed in claim 30.

47. (previously presented) Nanohybrid sol-gel catalyst for the heterogeneous aerobic catalysis containing tetra-*n*-propylammonium perruthenate (TPAP) entrapped in the sol-gel matrix obtained by a process as claimed in claim 34.

48. (previously presented) The process according to claim 26, wherein said cosolvent comprises methanol.

49. (currently amended) A sol-gel process for the production of nanohybrid sol-gel materials for heterogeneous aerobic catalysis containing tetra-*n*-propylammonium perruthenate (TPAP) entrapped in a sol-gel matrix, comprising hydrolyzing and co-polymerizing organosilanes and silanes in the presence of said TPAP, water, and an organic cosolvent; wherein said co-polymerization is carried out with a precursor fluorinated organosilane amount in the range from 10 mol% to 25 mol% of the co-

polymerization mixture and a non-fluorinated silane monomer; wherein the molar ratio among the total silica (Si), as fluorinated organosilane + silane, the amount of cosolvent, and the amount of water is in the range from 1:4:4 to 1:8:8.

50. (previously presented) The process according to claim 49, wherein said cosolvent comprises methanol.

51. (previously presented) A process for the selective heterogeneous aerobic catalytic oxidation of alcohols to carbonyls in a solvent, comprising employing as catalyst a nanohybrid sol-gel material based on silica organically modified and doped with the ruthenium species tetra-*n*-propylammonium perruthenate (TPAP), produced via a process according to claim 48, and employing a solvent selected from the group consisting of toluene, dichloromethane, and supercritical carbon dioxide.

52. (previously presented) Nanohybrid sol-gel catalyst for the heterogeneous aerobic catalysis containing tetra-*n*-propylammonium perruthenate (TPAP) entrapped in the sol-gel matrix obtained by a process as claimed in claim 48.